1. A method of automatically calibrating an electronic distance meter (EDM) subsystem of a total station, comprising the steps of:

receiving from at least one orbiting GPS satellite radio signals with timing information controlled by an atomic clock on board said satellite;

providing a global positioning system (GPS) receiver with a navigation computer for maintaining tracking of said radio signals and for deriving precise timing information from said radio signals;

providing a local reference oscillator with a timing signal based on said derived precise time information;

providing the EDM subsystem with a signal from said oscillator wherein said EDM subsystem sends an out-bound laser signal to a distant target and receives an in-bound signal reflected by said target;

measuring a difference between said out-bound signal and said resulting in-bound signal reflected from said distant surveyor target to determine the line-of-sight distance to said target;

wherein, the step of measuring provides a signal time-of-flight measurement with an accuracy derived from said precise timing information in said timing signal and from which a similarly accurate distance-to-target is computed.

2. The method of claim 1 wherein:

the step of measuring is based on a reference time base signal obtained from said local reference oscillator.

3. The method of claim 2 wherein:

said EDM subsystem includes a transmitter for sending said out-bound signal through a telescope to said distant target and a receiver for receiving said in-bound signal through said telescope.

4. The method of claim 3 wherein:

the step of measuring includes use of a phase measurement device connected to said reference oscillator, said transmitter and said receiver, wherein said phase measurement device provides said time measurement using said reference time base signal.

5. The method of claim 1 wherein:

said global positioning system receiver is remotely located to said EDM subsystem, and including the step of,

communicating via a radio link between said receiver and said EDM subsystem to drive said EDM system with a signal from said oscillator.

6. The method of claim 4 wherein:

said phase measurement device conducts pulse time-of-flight to determine the line-of-sight distance to said target.

7. The method of claim 4 wherein:

said phase measurement device conducts carrier phase measurements to determine the line-of-sight distance to said target.

8. The method of claim 4 wherein:

the step of measuring the time difference includes observations of a plurality of phase differences observed by said EDM subsystem at a plurality of out-bound and in-bound signals.

9. The method of claim 4 further including:

mounting said telescope to an angle measurement instrument connected to a servo actuator;

computing in said computer a space vector to target signal;

commanding said servo actuator to direct said telescope towards said target; and

locking in said telescope onto said target.

10. The method of claim 9 further including:

computing a target location seed representing a current position estimate of said telescope;

outputting said target location seed as a position estimate to determine an altitude and azimuth vector to said target;

creating a space vector to target signal from said position estimate;

commanding said servo actuator by said vector to target signal.

11. The method of claim 1 further including:

providing a 1 Hz signal from said GPS receiver with timing characteristics derived from said atomic clock; and

stabilizing said local reference oscillator by comparing zero crossings of signals of said local reference oscillator with zero crossings of said 1 Hz signal.

12. The method of claim 1 further including:

providing a first 1 Hz signal from said GPS receiver with timing characteristics derived from said atomic clock;

reducing the signal frequency of said local reference oscillator to a second 1 Hz signal;

phase comparing said first and second 1 Hz signals to provide an error signal;

providing the error signal to a phase control port in said local reference oscillator; and

synchronizing said reference oscillator to said 1 Hz signal from said GPS receiver.

13. A method of automatically calibrating an electronic distance meter (EDM) subsystem of a total station, comprising the steps of:

receiving from a time-standard broadcast transmitter source a timing reference signal from which a first comparison signal is derived;

operating a local reference oscillator at a particular frequency of operation;

receiving a first signal from said local reference oscillator and reducing said first signal to a second comparison signal;

phase comparing said first comparison signal with said second comparison signal to provide an error signal;

processing said error signal to create a control signal to provide to said local reference oscillator to obtain phase synchronization of said local reference oscillator with said time-standard broadcast transmitter timing reference signal; and

providing the EDM system with a synchronized reference signal from said local reference oscillator.

14. The method of claim 13 wherein:

said EDM subsystem further provides an out-bound signal directed towards a distance target, and receives an in-bound signal reflected by said target;

measuring a difference between said out-bound signal and said resulting in-bound signal reflected from said distant target to determine the line-of-sight distance to said target; and

wherein the step of measuring provides a signal time-of-flight measurement with an accuracy derived from said time standard broadcast transmitter and from which a similarly accurate distance-to-target estimate is computed.

15. The method of claim 13 wherein:

said time-standard broadcast transmitter source includes a receiver tuned to receive and synchronized to time data broadcast from NIST via short-wave radio.

16. The method of claim 13 wherein:

said time-standard broadcast transmitter source includes a receiver to receive alternate timing signals and to synchronize said time-standard broadcast transmitter to said alternate timing signals, wherein said alternate timing signals are provided from a second time reference station drawn from the group of WWV in Fort Collins, Colorado or WWVH in Hawaii.

17. The method of claim 13 wherein:

said time-standard broadcast transmitter includes an orbiting GPS satellite.

18. The method of claim 1 further including the step of:

computing in said navigation computer a current three-dimensional position of the EDM subsystem.